

Appl. No. 10/582,297Docket: 15447NP

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of controlling the displacements of a moving portion of a multi-axis robot along a path, ~~the method being characterized in that it comprises the steps consisting in comprising:~~

- providing movement instructions $[(300)]$ to a path generator $[(400)]$, the instructions including at least information relating to the shape of the path $[(320)]$ and to force setpoints $[(310)]$;

- calculating an external force signal $[(800)]$ representing at least one component of the force $[(F)]$ exerted by said moving portion $[(0)]$ on its environment;

- acting at a predetermined sampling frequency to provide said external force signal $[(800)]$ to said path generator $[(400)]$;

- calculating, with said path generator $[(400)]$ and at a predetermined sampling frequency, movement setpoints $[(500)]$ along said path $[(320)]$ in such a manner as to minimize the difference between the projection $[(FT)]$ of the external force

onto the tangent $[(T)]$ of the path and the projection of the force setpoint onto said tangent; and

· delivering said movement setpoints $[(500)]$ to a servo-control means ~~(601-606)~~ enabling at least one axis of said robot $[(600)]$ to be set into movement in compliance with said movement setpoints $[(500)]$.

2. (Currently Amended) $[[A]]$ The method according to claim 1, ~~characterized in that~~ wherein said external force signal $[(800)]$ is calculated from information representing the current flowing in at least one actuator ~~(601-606)~~ of said robot $[(600)]$.

3. (Currently Amended) $[[A]]$ The method according to claim 1, ~~characterized in that it includes a step consisting in~~ including using a dynamic model $[(712)]$ of said robot $[(600)]$ while calculating said external force signal $[(800)]$.

4. (Currently Amended) $[[A]]$ The method according to claim 1, ~~characterized in that it includes a step consisting in~~ including supplying said path generator $[(400)]$ with at least one velocity limit value $[(330)]$ and/or at least one acceleration limit value $[(340)]$ for taking into account while calculating

Appl. No. 10/582,297Docket: 15447NP

said movement setpoints $[(500)]$, such that said setpoints comply with said limit value(s).

5. (Currently Amended) Apparatus for controlling the displacements of a moving portion of a multi-axis robot along a path, ~~the apparatus being characterized in that it comprises~~ comprising:

- a path generator $[(400)]$ suitable for calculating movement setpoints $[(500)]$ as a function of movement instructions $[(300)]$ including at least information relating to the shape of the path $[(320)]$ and to its force setpoints $[(310)]$; and

- a force estimator $[(700)]$ suitable for generating an external force signal $[(800)]$ representing at least one component of the force $[(F)]$ exerted by said moving portion $[(O)]$ on its environment and for delivering said signal to said path generator at a predetermined sampling frequency, where said path generator is suitable for calculating said movement setpoints $[(500)]$ along said path $[(320)]$ at a predetermined sampling frequency in such a manner as to minimize the difference between the projection $[(FT)]$ of the external force on the tangent $[(T)]$ to the path and the projection of the force setpoint onto said tangent, said movement setpoints $[(500)]$

Appl. No. 10/582,297Docket: 15447NP

being delivered to a servo-control means ~~(601-606)~~ enabling at least one axis of said robot ~~[[600]]~~ to be set into movement.

6. (Currently Amended) ~~Apparatus~~ The apparatus according to claim 5, ~~characterized in that it comprises~~ further including a program interpreter means ~~[[200]]~~ suitable for executing programs containing movement instructions ~~[[300]]~~ enabling at least the shape of the path ~~[[320]]~~ and force setpoints ~~[[310]]~~ to be specified.